Appendix E - DAPSII/DOMSAT Interface Requirements

Platform messages shall be transmitted to DCS users via a Domestic Satellite (DOMSAT) using the formats described herein.

The data transmission format to be employed resembles the CCITT standard X.25 protocol using Link Access Procedure B and Permanent Virtual Circuit at the Link and Packet levels. Data shall be transmitted at 56 kbps to allow for a maximum real throughput rate of 47 kbps, message retransmissions, and format overhead. Since the data stream is to be transmitted in broadcast mode, with no opportunity for the receiving station to acknowledge data reception, this method of transmission represents only a partial implementation of the X.25 protocol.

The formats to be employed are presented in tabular form. The "Reference" column of the table refers either to Section 2 of the DAPSII SOW or to the X.25 standard, which may be found in the CCITT documentation and also in Federal Standard 1041 and FIPS Publication 100 of the Department of Commerce. Items not referenced are described herein. Sequences of eight zeros and ones found in the "Format" column represent the actual bit content of the respective data fields.

Data shall be transmitted using X.25 Frames (Table 1), separated by a continuous stream of Flag bytes, both described below. The Flag bytes are not part of the frame, but are included in the table as a reminder that successive frames must be separated by at least one Flag. The Flags are used both as filler and to allow the receiving station to attain synchronization with the data stream. The latter function requires that Flag sequences not be present inside the frames. To accomplish this, "bit stuffing" must be employed. An additional zero bit shall be appended to each instance of five consecutive ones in the frame data. The receiving station must then remove all zero bits following sequences of five (but not six) one bits.

Table 1-X.25 Frame

Reference	Element Name	Bytes	Format
X.25	Flag	1	01111110
X.25	Frame Address	1	Binary
X.25	Command	1	Binary
X.25	Packet	4 to 256	
X.25	CRC	2	Binary
X.25	Flag	1	01111110

Each X.25 Packet (Table 2) shall begin with the standard three bytes, the first two of which shall be constant in this implementation. The third byte contains "more data bit" and "sequence" fields labelled "M" and "SSS", respectively, in the table. The "sequence" field is the X.25 send sequence number. The "more data bit" shall be a zero if this packet completes the transmission of a DCP message Data Block and one otherwise.

The 16 bit binary "Message Sequence Number" shall be transmitted as the first two data bytes of each packet, followed by the eight bit binary "Dup Flag & Packet Sequence". The "Message Sequence

Number" is incremented by one as each new DCP message is transmitted, and is zeroed at overflow. Thus, it will remain constant for all packets of a given message Data Block. Its primary function is to provide an additional check that all transmitted messages have been received. The "Dup Flag & Packet Sequence" consists of a one bit flag (D) indicating that this message is a retransmitted duplicate of a previous message, followed by a seven bit sequence number (SSSSSSS), which starts at one with the initial packet for each message Data Block and increments until the entire data block has been transmitted. The remainder of the packet consists of up to 250 bytes of the Data Block.

-X.25 Packet Table 2

Reference	Element Name	Bytes	Format
X.25	Group		00010000
X.25	Channel	1	00000000
X.25	Type	1	000MSSS0
6.9.1.1	Message Sequence Number	2	Binary
	Dup Flag & Packet Sequence	1	DSSSSSSS
	Data Block Segment	1 to 250	

The Data Block (Table 3) consists of the data stored in the corresponding record of the DAPSII Message File data base or equivalent, with two exceptions. First, the "Message Data Length" field is transmitted in binary, rather than as five ASCII digits. Second, an ASCII ETB character is appended to the record as a terminator. The binary "Message Data Length" field allows the receiving station to determine the end of the "Message Data" field without resorting to a search for the ETB terminator, thereby enabling the use of arbitrary binary sequences in DCP messages in future implementations. All fields except binary fields shall have parity bits zeroed.

Table 3 Data Block

Reference	Element Name	Bytes	Format
6.4.1.3.1	Address	8	Hex
6.4.1.3.2	Year	2	Num
6.4.1.3.2	Day of Year	3	Num
6.4.1.3.2	Hour	2	Num
6.4.1.3.2	Minute	2	Num
6.4.1.3.2	Second	2	Num
6.4.1.3.3	Failure Code	1	Alpha
6.4.1.3.4.1	Signal Strength	2	Num
6.4.1.3.4.2	Frequency Offset	2	Num
6.4.1.3.4.3	Modulation Index	1	Alpha
6.4.1.3.4.4	Data Quality	1	Alpha
6.4.1.3.5	Channel Received	3	Num
6.4.1.3.6	GOES Spacecraft Received	1	Alpha
6.4.1.3.7	Uplink Carrier Status (IFPD)	1	Binary
6.4.1.3.8	Message Data Length	2	Binary
6.4.1.3.9	Message Data	0 to 15750	Alpha/Bin

ASCII	ETB	1	00010111